OHS04260

SECTION 1 CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

MDL INFORMATION SYSTEMS, INC.
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SAN LEANDRO, CA 94577
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FOR EMERGENCY SOURCE INFORMATION
CONTACT: 1-615-366-2000 USA

CAS NUMBER: 124-38-9
RTECS NUMBER: FF6400000
EU NUMBER (EINECS):
204-696-9

SUBSTANCE: CARBON DIOXIDE, GAS

TRADE NAMES/SYNONYMS:
CARBONIC ACID GAS; CARBONIC ANHYDRIDE; CARBON DIOXIDE; CARBON OXIDE; CARBON DIOXIDE GAS; CARBON DIOXIDE, CARBONIC ANHYDRIDE; UN 1013; STCC 4904535; CO2; OHS04260

CHEMICAL FAMILY:
oxides of carbon

CREATION DATE: 02/11/85 REVISION DATE: 10/31/96

SECTION 2 COMPOSITION, INFORMATION ON INGREDIENTS

JSC MSDS #11672

COMPONENT: CARBON DIOXIDE, GAS
CAS NUMBER: 124-38-9
PERCENTAGE: 100

SECTION 3 HAZARDS IDENTIFICATION

NFPA RATINGS (SCALE 0-4): HEALTH=1 FIRE=0 REACTIVITY=0

EMERGENCY OVERVIEW:
COLOR: colorless.
PHYSICAL FORM: gas.
ODOR: odorless.
MAJOR HEALTH HAZARDS: difficulty breathing.
PHYSICAL HAZARDS: Containers may rupture or explode if exposed to heat.

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POTENTIAL HEALTH EFFECTS:
INHALATION:
SHORT TERM EXPOSURE: ringing in the ears, nausea, irregular heartbeat, headache, drowsiness, dizziness, tingling sensation, visual disturbances, suffocation, convulsions, coma.
LONG TERM EXPOSURE: no information on significant adverse effects.
SKIN CONTACT:
SHORT TERM EXPOSURE: no information on significant adverse effects.
LONG TERM EXPOSURE: no information on significant adverse effects.
EYE CONTACT:
SHORT TERM EXPOSURE: irritation.
LONG TERM EXPOSURE: no information on significant adverse effects.
INGESTION:
SHORT TERM EXPOSURE: ingestion of a gas is unlikely.
LONG TERM EXPOSURE: ingestion of a gas is unlikely.

CARCINOGEN STATUS:
OSHA: N
NTP: N
IARC: N

SECTION 4 FIRST AID MEASURES

INHALATION: When safe to enter area, remove from exposure. Use a bag valve mask or similar device to perform artificial respiration (rescue breathing) if needed. Keep warm and at rest. Get medical attention immediately.

SKIN CONTACT: Wash if needed. If frostbite, freezing, or cryogenic burns occur, warm affected area in warm water. If this is not available, gently wrap affected parts in blankets. Allow circulation to return naturally. Get medical attention immediately.

EYE CONTACT: It is unlikely that emergency treatment will be required. Wash with large amounts of water or normal saline until no evidence of chemical remains (at least 15-20 minutes). Get medical attention immediately.

INGESTION: It is unlikely that emergency treatment will be required. Get medical attention, if needed.

NOTE TO PHYSICIAN: For inhalation, consider oxygen.

SECTION 5 FIRE FIGHTING MEASURES

FIRE AND EXPLOSION HAZARDS: Negligible fire hazard.

EXTINGUISHING MEDIA: carbon dioxide, regular dry chemical.

Large fires: Use regular foam or flood with fine water spray.

FIREFIGHTING: Move container from fire area if it can be done without risk. Cool containers with water spray until well after the fire is out. Stay away from the ends of tanks. Withdraw immediately in case of rising sound from venting safety device or any discoloration of tanks due to fire. For tank, rail car or tank truck, evacuation radius: 1/2 mile. Use extinguishing agents appropriate for surrounding fire. Cool containers with water spray until well after the fire is out. Apply water from a protected location or from a safe distance. Do not get water directly on material. Reduce vapors with water spray. Avoid inhalation of material or combustion by-products. Stay upwind and keep out of low areas. Consider downwind evacuation if material is leaking.

FIREFIGHTING PROTECTIVE EQUIPMENT: Full firefighting turn-out gear (bunker gear). Any supplied-air respirator with full facepiece and operated in a pressure-demand or other positive-pressure mode in combination with a separate escape supply. Any self-contained breathing apparatus with a full facepiece.

SECTION 6 ACCIDENTAL RELEASE MEASURES

OCCUPATIONAL RELEASE:
Stop leak if you can do it without risk. Keep unnecessary people away, isolate hazard area and deny entry. Stay upwind and keep out of low areas.

SECTION 7 HANDLING AND STORAGE

Store and handle in accordance with all current regulations and standards. Subject to storage regulations: U.S. OSHA 29 CFR 1910.101. Keep separated from incompatible substances.

SECTION 8 EXPOSURE CONTROLS, PERSONAL PROTECTION

EXPOSURE LIMITS:
CARBON DIOXIDE, GAS:
CARBON DIOXIDE:
5000 ppm (9000 mg/m3) OSHA TWA
10000 ppm (18000 mg/m3) OSHA TWA (vacated by 58 FR 35338, June 30, 1993)
30000 ppm (54000 mg/m3) OSHA STEL (vacated by 58 FR 35338, June 30,

1993)
5000 ppm (9000 mg/m3) ACGIH TWA
30000 ppm (54000 mg/m3) ACGIH STEL
5000 ppm (9000 mg/m3) NIOSH recommended TWA 10 hour(s)
30000 ppm (54000 mg/m3) NIOSH recommended STEL
5000 ppm (9000 mg/m3) DFG MAK TWA
10000 ppm (18000 mg/m3) DFG MAK peak 60 minute momentary value 3 times/shift

MEASUREMENT METHOD: Gas collection bag; Gas chromatography with thermal conductivity detector; NIOSH III # S249

VENTILATION: Provide local exhaust ventilation system. Ensure compliance with applicable exposure limits.

EYE PROTECTION: Eye protection not required, but recommended.

CLOTHING: For the gas: Protective clothing is not required. For the liquid: Wear appropriate protective, cold insulating clothing.

GLOVES: Protective gloves are not required, but recommended.

RESPIRATOR: The following respirators and maximum use concentrations are drawn from NIOSH and/or OSHA. Respiratory equipment must be certified by NIOSH/MSHA.
40,000 ppm
Any supplied-air respirator.
Any self-contained breathing apparatus with a full facepiece.
Escape -
Any appropriate escape-type, self-contained breathing apparatus.
For Unknown Concentrations or Immediately Dangerous to Life or Health -
Any supplied-air respirator with full facepiece and operated in a pressure-demand or other positive-pressure mode in combination with a separate escape supply.
Any self-contained breathing apparatus with a full facepiece.

SECTION 9 PHYSICAL AND CHEMICAL PROPERTIES

COLOR: colorless
PHYSICAL FORM: gas
ODOR: odorless
TASTE: acid taste
MOLECULAR WEIGHT: 44.01
MOLECULAR FORMULA: C-O2
BOILING POINT: No data available.
FREEZING POINT: -71 F (-57 C) @ 4000 mmHg
SUBLIMATION POINT: -110 F (-79 C)
VAPOR PRESSURE: 43700 mmHg @ 21 C

VAPOR DENSITY (air=1): 1.5
SPECIFIC GRAVITY (water=1): 1.522 @ 21 C
WATER SOLUBILITY: soluble
PH: acidic in solution
VOLATILITY: not applicable
ODOR THRESHOLD: No data available.
EVAPORATION RATE: not applicable
SOLVENT SOLUBILITY:
Soluble: alcohol, acetone, hydrocarbons, organic solvents

SECTION 10 STABILITY AND REACTIVITY

REACTIVITY: Stable at normal temperatures and pressure.

CONDITIONS TO AVOID: Protect from physical damage and heat. Containers may rupture or explode if exposed to heat.

INCOMPATIBILITIES: combustible materials, oxidizing materials, metal salts, reducing agents, metal carbide, metals, bases.

CARBON DIOXIDE:{*}ACRYLALDEHYDE: Exothermic polymerization.{*}BARIUM PEROXIDE: Incandescent reaction.{*}CESIUM OXIDE: Ignition.{*}DIETHYL MAGNESIUM: Ignition.{*}ETHYLENEIMINE: Explosive polymerization.{*}HYDRAZINE: Decomposition.{*}METAL ACETYLIDES: Ignition or incandescence.{*}METAL HYDRIDES: Reduction reaction.{*}METALS: Dusts of many metals suspended in carbon dioxide atmospheres are{*} ignitable and explosive; some bulk metals will burn in the gas at elevated{*} temperatures.{*}POTASSIUM: Mixtures of the solids are impact-sensitive.{*}POTASSIUM-SODIUM ALLOY: Mixtures of the solids are impact-sensitive.{*}SODIUM: Mixtures of the solids are impact-sensitive.{*}SODIUM PEROXIDE: Highly exothermic reaction; may be explosive in the presence{*} of metals.{*}

POLYMERIZATION: Will not polymerize.

SECTION 11 TOXICOLOGICAL INFORMATION

CARBON DIOXIDE, GAS:
TOXICITY DATA:
9 pph/5 minute(s) inhalation-human LCLo; 90000 ppm/5 minute(s) inhalation-mammal LCLo; 10000 ppm/24 hour(s)-30 day(s) continuous inhalation-rat TCLo; 27000 ppm/24 hour(s)-30 day(s) continuous inhalation-rabbit TCLo.
CARCINOGEN STATUS: None.
ACUTE TOXICITY LEVEL: Insufficient Data.
TARGET ORGANS: No data available.

MEDICAL CONDITIONS AGGRAVATED BY EXPOSURE: heart or cardiovascular problems, respiratory problems.

REPRODUCTIVE EFFECTS DATA:
6 pph inhalation-rat TCLo/24 hour(s) 10 day(s) pregnant female continuous; 6 pph inhalation-rat TCLo/24 hour(s) 10 day(s) pregnant female continuous; 55 pph inhalation-mouse TCLo/2 hour(s) 3 day(s) male; 55 pph inhalation-mouse TCLo/4 hour(s) 6 day(s) male; 2 pph inhalation-mouse TCLo/8 hour(s) 10 day(s) pregnant female continuous; 13 pph inhalation-rabbit TCLo/4 hour(s) 9-12 day(s) pregnant female continuous.

HEALTH EFFECTS:

INHALATION:

ACUTE EXPOSURE:

CARBON DIOXIDE: In the solid or liquid form carbon dioxide is very volatile, readily releasing the gas. At concentrations from 2-10% it may cause acidic taste, dyspnea, headache, vertigo, nausea, labored breathing, weakness, drowsiness, mental confusion, and increase in blood pressure, pulse, and respiratory rate. Exposure to 10% for a few minutes has been reported to cause visual disturbances, tinnitus, tremors, profuse perspiration, restlessness, paresthesias, general feeling of discomfort, loss of consciousness, and coma. Concentrations of 25-30% may cause coma and convulsions within one minute. Tachycardia and arrhythmias are possible. Concentrations of 50% may cause symptoms of hypocalcemia including carpopedal spasms. Excessive carbon dioxide for a time period of not more than 5 minutes was reported to cause effects on vision with constriction of visual fields, enlargement of blind spots, photophobia, loss of convergence and accommodation, and deficient dark adaptation as well as headache, insomnia, and personality changes, largely depression and irritability. Even when there is sufficient oxygen present to prevent simple asphyxiation by carbon dioxide, high concentrations may cause adverse effects by interfering with its normal elimination from the body. Initially, exposure to increased carbon dioxide concentrations results in a compensatory increase in both rate and depth of ventilation. Beyond a certain point, however, this may reverse to hypoventilation resulting in respiratory acidosis. Death from asphyxia may occur if the concentration and duration of exposure are sufficient. Reproductive effects have been reported in animals.

CHRONIC EXPOSURE:

CARBON DIOXIDE: It has been reported that persons may tolerate 1.5% in inhaled air for prolonged periods without adverse effects, but calcium/phosphorus metabolism may be affected with serum levels of calcium and urinary phosphorus progressively falling. At 2% concentration, deepened respiration may occur. At 3% impairment of performance has been noted. It has, however, been demonstrated that the development of tolerance may occur during prolonged exposure to low levels. Reproductive effects have been reported in animals.

SKIN CONTACT:
ACUTE EXPOSURE:
CARBON DIOXIDE: No adverse effects have been reported from exposure to the gas. Due to rapid evaporation, the liquid or solid may cause frostbite with redness, tingling and pain or numbness. In more severe cases, the skin may become hard and white and develop blisters.

CHRONIC EXPOSURE:
CARBON DIOXIDE: No adverse effects are expected from exposure at low levels.

EYE CONTACT:
ACUTE EXPOSURE:
CARBON DIOXIDE: At high concentrations in air, carbon dioxide may cause a stinging sensation of the eyes. 200,000 ppm of the gas may cause irritation. Due to rapid evaporation, the liquid or solid may cause frostbite with redness, pain, and blurred vision.

CHRONIC EXPOSURE:
CARBON DIOXIDE: No adverse effects are expected from exposure to low levels.

INGESTION:
ACUTE EXPOSURE:
CARBON DIOXIDE: Ingestion of a gas is unlikely. If the liquid or solid is swallowed, frostbite damage of the lips, mouth and mucous membranes may occur.

CHRONIC EXPOSURE:
CARBON DIOXIDE: No data available.

SECTION 12 ECOLOGICAL INFORMATION

ECOTOXICITY DATA:
FISH TOXICITY: 150000 ug/L 48 day (Mortality) Brown trout (Salmo trutta).

SECTION 13 DISPOSAL CONSIDERATIONS

Dispose in accordance with all applicable regulations.

SECTION 14 TRANSPORT INFORMATION

U.S. DOT 49 CFR 172.101 SHIPPING NAME-UN NUMBER: